THE "SUBGLUTEAL" TRIANGLE AND ITS SURGICAL IMPORTANCE.[1]

By RAMON GUITÉRAS, M.D.,

OF NEW YORK,

PROFESSOR OF ANATOMY AND OPERATIVE SURGERY IN THE NEW YORK POST-GRADUATE MEDICAL SCHOOL; CONSULTING SURGEON TO THE FRENCH HOSPITAL; VISITING SURGEON TO THE CITY AND COLUMBUS HOSPITALS.

THE principal tissues in the gluteal region are the muscles and their fascias ; the nerves of the sacral plexus, the greater and lesser sciatic, the gluteal, and pudic ; some of the branches of the internal iliac artery, the gluteal, sciatic, and pudic.

If we survey this region,—that is, the nates,—and the posterior thigh, with the skin and superficial fascia removed, we will see the glutæus maximus muscle, and below this the hamstring muscles, the flexors of the leg on the thigh.

If, now, we observe this region carefully, we will see that one band of the hamstring muscles passes obliquely downward and across from the inner to the outer side of the thigh from beneath the glutæus maximus muscle. This is the long head of the biceps, which crosses over to meet the short head, and thus form the outer hamstring. These muscles are here held together by an intermuscular septum, which passes down and forms a band between the biceps and the vastus externus. The fascia lata on the back of the thigh extends downward from the crest of the ilium, sacrum, and coccyx, and, splitting, includes the glutæus maximus between its two layers. It then covers the hamstring muscles and sends in two septa, one to separate the vastus externus from the outer hamstring, the other to separate the vastus internus from the adductors. (Fig. 1.)

---

[1] Read before the Surgical Section of the New York Academy of Medicine, January 11, 1895.

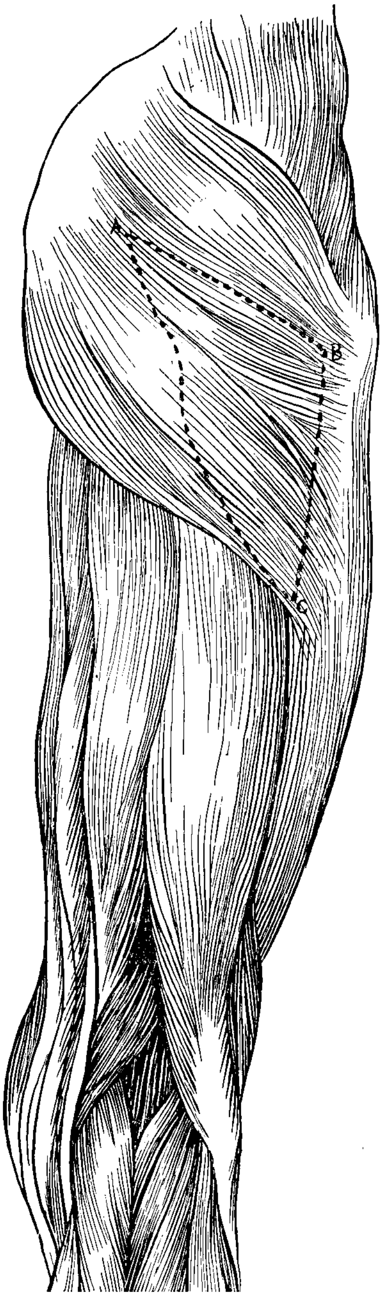

FIG. 1.—Posterior muscles of the thigh.

The door of the triangle in question is opened by cutting through the glutæus maximus muscle and reflecting it on either side. (Fig. 2.)

We now notice that the point where the glutæus maximus comes in contact with the biceps is the apex of a triangle, the outer border of which is the line of attachment of the gluteus maximus continued upward towards the great trochanter, the inner is the long head of the biceps extending up to the tuber ischii. An imaginary line drawn between these two points—namely, the greater trochanter and the tuber ischii—might complete this triangle; but if we look a little higher, we will see the pyriformis muscle running across from the greater trochanter to disappear beneath the sacro-sciatic ligament a little above the tuber ischii and forming the base. Its borders would therefore be externally the line of attachment of the glutæus maximus to the femur and its greater trochanter; internally, the long head of the biceps, the tuber ischii, and part of the sacro-sciatic ligament; and above the pyriformis. If we want to be more exact in regard to the apex, we can go a little further and say that it is formed by the uniting of the two heads of the biceps, in which case the attachment of the lesser head would form part of the outer border of the triangle. The floor is made by the superior and inferior gemelli, the obturators, internus and externus, the quadratus femoris, and the adductor magnus.

The contents of this triangle are arteries, veins, nerves, lymphatics, fatty tissue, and bursæ. The arteries are the sciatic and pudic, terminal branches of the internal iliac, the internal circumflex, and the superior perforating.

The sciatic artery is about the size of the lingual. It is seen in the upper part of this space, appearing at the lower border of the pyriformis muscle, between the lesser sciatic and pudic nerves, and descends downward just to the outer side of the tuber ischii. Over the floor of this space it anastomoses with the internal circumflex and the superior perforating. Its branches in this region are the coccygeal, inferior gluteal, comes nervi ischiadici, muscular and articular. The

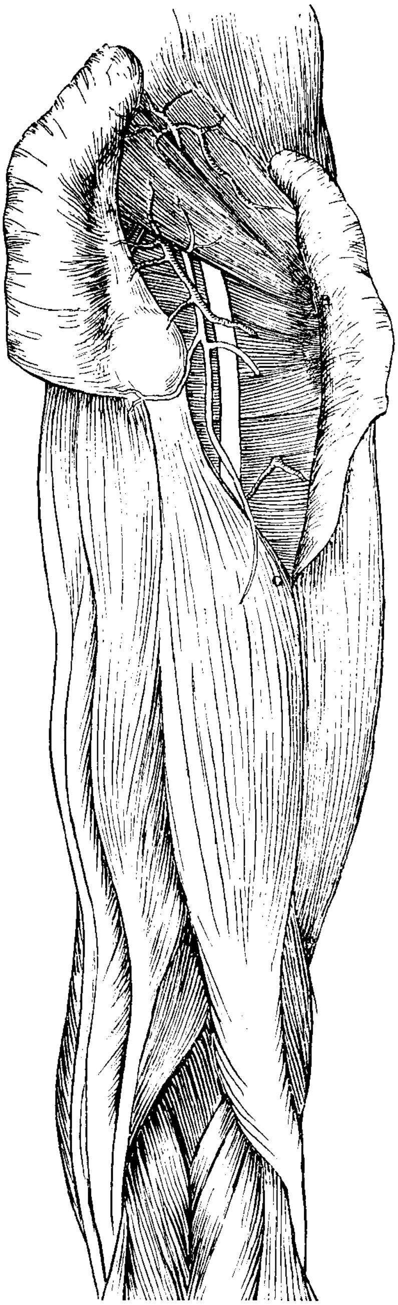

FIG. 2 —The subgluteal triangle.

internal pudic artery runs over the spine of the ischium at the upper inner angle of the space, escaping from the pelvis through the great sacro-sciatic notch, and re-entering it through the lesser sacro-sciatic foramen. This is also a terminal branch of the internal iliac artery.

The internal circumflex is a branch of the profunda femoris, and comes from the anterior region of the thigh, entering this space between the quadratus femoris and the upper border of the adductor magnus, and giving off ascending and descending branches.

The superior perforating pierces the adductor magnus near the apex of this triangle, and also gives off ascending and descending branches.

These arteries form a chain of anastomoses along the posterior surface of the thigh on the adductor magnus, anastomosing with one another and indirectly with the profunda and branches of the popliteal below. This chain of anastomoses chiefly supplies the collateral circulation after ligature of the femoral artery above the profunda. The femoral artery occasionally runs through this region to the popliteal space in company with the great sciatic nerve. The artery in this case is not really the femoral, but a greatly enlarged sciatic.

Veins.—The veins of this region are the sciatic and the venæ comites accompanying the pudic.

Nerves.—The nerves found here are from the sacral plexus, the great and small sciatic, the nerve to the obturator internus, and the pudic. The pudic nerve runs the same course as the artery across the upper and inner angle.

The small sciatic runs down through the space superficially.

The great sciatic extends through the centre of the triangle, a little nearer the inner border, and disappears beneath the long head of the biceps. It is the largest nerve in the body. Occasionally this nerve pierces the pyriformis muscle instead of passing beneath it, and at other times it divides into the internal and external popliteal in this space.

The nerve to the obturator internus is also seen in the upper and inner angle of this space.

Lymphatics.—These follow the course of the sciatic artery, and then the internal iliac up to the lumbar region.

Bursæ.—These will be considered later.

Surgical Importance of this Space.—Perhaps the most important step that can be taken here is the stretching of the sciatic nerve. This has been done for sciatica, locomotor ataxia, and the like, but is usually performed at present for leprosy.

In these cases it is not a curative but a palliative operation, and its results are more satisfactory to the patient than those obtained by any medicine. For a long time it was thought that operating on lepers was not advisable on account of their cachectic condition.

Some operators claim, however, that the wounds of lepers heal more quickly than those of healthy individuals, and argue that this is due to the rapid clotting of blood on account of the extra amount of fibrin it contains. Rake, of St. Louis, who was for some time in charge of a leper asylum in Trinidad, estimates the amount of fibrin in the blood of a leper as three times that found in normal blood.

The stretching of the nerve in lepers is usually performed for anæsthesia, pain, ulceration, necrosis, and tuberculation. It is most commonly stretched in the anæsthetic variety for perforating ulcer of the foot, with or without pain. The relief in these cases is often marvellous, and patients who begged for an amputation on account of the pain present have been almost immediately relieved by stretching. The relief derived from such a procedure frequently lasts for a year, the pain disappearing and the perforating ulcer healing. In 50 per cent. of these cases the nerve has been found to be enlarged.

The operation usually consists in making a vertical incision, midway between the tuber ischii and the greater trochanter through the glutæus maximus. In this way, one does not come directly on the nerve, as it lies a little nearer the tuber ischii.

A better incision is one made just below the lower border of the glutæus maximus muscle through the skin, superficial and deep fascias. This enables us to reach the nerve and stretch it without cutting any muscular fibres. If an incision of this nature is made, the fingers can be introduced into the triangle. If they are introduced palm downward, the outer border of the insertion of the glutæus maximus can be easily felt, and then by sweeping the fingers inward, the nerve can be easily encountered. Having taken hold of the nerve, it is better to place four fingers of the hand beneath it, rather than one, as it is then more evenly supported. In stretching, care must be taken to stretch steadily and slowly, and not with sufficient force to tear the nerve. Trombetta, who has gone into the subject quite extensively, found that it takes 183 pounds of force to tear the sciatic. Thus the ordinary patient could be lifted clear from the operating-table without tearing the nerve. It appears, however, that it would be exceedingly dangerous to stretch the nerve to this extent, for, whereas the force might not be sufficient to tear the nerve proper, it might tear it from its origin in the spinal cord.

Aneurism of the Sciatic Artery.—The usual aneurism of this part forms a tumor circumscribed or diffused on the side of the buttock some distance behind the great trochanter. It usually has some sound, a whir or a hum, which in the same case may be at times present and at times absent. It is usually accompanied by a considerable pain, not confined to its seat, but running forward on the dorsum ilii, downward on the back of the thigh and leg, and sometimes in the perineum ; in fact, taking the direction of the courses of the nerves on which it presses. Severe cramps of the leg and foot frequently accompany this trouble. Thus, it has often been mistaken for rheumatism, gout, sciatica, and other diseases, and treated as such.

Aneurisms in this locality are frequently the result of injury, falls, blows, etc. They are diffuse or sacculated. They vary in size from a hen's egg to a child's head.

There are several methods of treating aneurism of this artery. Of these, the ligation of the internal iliac seems to be the most popular, but the results have not been as good as in the cases of injecting coagulating fluid and the opening and tying at both ends (Antyllus's method).

Hæmorrhage of this artery frequently occurs, due to punctured wounds in the gluteal region, and is very troublesome and unsatisfactory to handle. The artery in these cases may be wounded in this region, or the instrument may penetrate through one of the notches and wound it or the internal iliac in the pelvis. In such instances, the diagnosis of the source of the hæmorrhage is difficult, and the ground should be explored by enlarging the wound and inserting a finger, or by making a subgluteal incision and going up into the space from below. If the vessel is wounded in the triangle, it should be ligated on either side of the wound.

If it be intrapelvic, compression of the common iliac should be first tried. Pressure must at the same time be made on the wound itself to assist in the formation of a clot at this point. If this does not succeed, ligation of the internal iliac must be resorted to.

Enormous hæmorrhages have been recorded as occurring under the glutæus maximus, of sufficient size to cause the death of the patient.

The pudic artery may also be wounded in this space.

Ligation of the Sciatic Artery.—This artery escapes from the pelvis through the great sacro-sciatic opening. It is accompanied by a vein which lies at its inner side.

Make an incision two inches long in the centre of a line drawn from the posterior superior spinous process to the tuber ischii, and ligate it where it emerges from the pelvis. It is on the inner side of the lesser sciatic nerve. A little internal to this is the pudic artery, accompanied by its venæ comites.

Bursæ.—There are three principal synovial bursæ in this region separating the under surface of the glutæus maximus from the eminences which it covers.

One of these of large size, and generally multilocular, separates it from the greater trochanter.

A second, often wanting, is situated on the tuberosity of the ischium.

A third is found between the tendon of the muscle and the vastus externus.

Inflammation of these Bursæ.—In the first class there is usually a history of a blow upon the trochanter, which is rapidly followed by a swelling and pain over the injured part. Suppuration may then set in, often forming large accumulations which burst, giving relief. The part now feels free and painless, and the patient recovers rapidly, or else a sinus follows. This resembles hip-disease somewhat; the principal points of difference between the two are that in the former there is no pain on forcing the joint surfaces together, nor by upward force imparted to the femoral head by blows upon the knee, etc. There is also no pain in the hip-joint itself or any referred to the knee, but there is pain on pressure right over the trochanter. This condition often gives rise to caries of the trochanter.

Treatment.—If the collection is large, aspirate or incise. When there is a sinus, it should be treated accordingly.

The inflammation of the bursæ which frequently exists over the tuber ischii is very annoying. It usually occurs in those whose occupations demand a sitting position, with an occasional gliding movement. These lesions are called "weaver's or lighterman's bottoms." If suppuration occurs, troublesome sinuses are apt to result.

Ischiatic Herniæ.—These are very rare. The subject has been quite extensively investigated by Le Dentu and Wassilieff; and Bertrandi, Lasus, Verdier, Jones, Camper, and others have reported cases. It is probable, however, that there are many herniæ of this variety that have never come to the surgeon's notice, or that coming have not been diagnosticated. This is proven by the fact that cases have occasionally been found at autopsies which have given no trouble to the individual during life.

These cases are extremely difficult to diagnose, as they are concealed from view and are rendered difficult to palpate through that thick pad of muscle,—the glutæus maximus.

These herniæ are usually small, but they are sometimes of large size. They may contain omentum, large or small intestines, mesentery, and even rectum or bladder, singly or combined.

They usually follow the course of the internal iliac artery. There are two varieties, those above and below the pyriformis. The second variety would come into the space in question. They descend between the inferior border of the pyriformis and the lesser sacro-sciatic ligament. They can be reduced by taxis in some cases, while in others an operation is necessary. In case of strangulation, incision should be made inward into the sacro-sciatic ligament.

Gluteal Abscesses.—Abscesses may occur in this space *de novo*, or there may be collections of pus coming out through the great sciatic notch from caries of the vertebræ or pelvic bones; or abscesses of the tissues within the pelvis.

This is not the favorite path for the abscess of Pott's disease to travel; as, for example, in the table of Michel, but three opened in the gluteal region, whereas fourteen occupied the iliac fossæ and the upper and inner or outer part of the corresponding thigh. The pus from these abscesses occasionally does not stop in this region, but keeps on down the thigh to the popliteal space, and even to the region of the ankle.

Excision of the Hip-Joint.—The close association between the floor of this space and the hip-joint is important to be borne in mind in excisions of that joint on account of the danger of wounding the important tissues contained here. This may be avoided by attention to the valuable points advocated by Langenbeck and Sayre,—that is, to perform as much of a subperiosteal operation as possible, and if the tendons of the muscles attached to the great trochanter behind are to be cut, the effort should be made to dissect them away from their insertions on the bone.